

***United States Court of Appeals
for the Second Circuit***



**APPELLANT'S
REPLY BRIEF**

76-7490
76-7514

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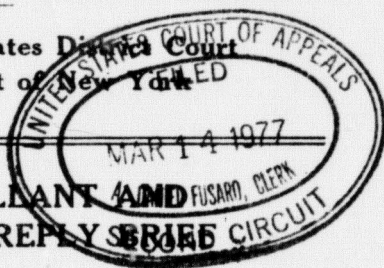
EUTECTIC CORPORATION, NEW METALS
CORPORATION and METALLIZING
COMPANY OF AMERICA, INC.,
*Plaintiffs-Appellees
and Cross-Appellants,*

v.

METCO, INC.,
*Defendant-Appellant
and Cross-Appellee.*

Appeal from the United States District Court
for the Southern District of New York

DEFENDANT-APPELLANT AND
CROSS-APPELLEE'S REPLY



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TABLE OF ABBREVIATIONS USED IN THIS BRIEF

D.M.B. . . .	Refers to Defendant's Main Brief herein.
PX . . .	Refers to exhibits offered by plaintiff.
DX . . .	Refers to exhibits offered by defendant.
J.A. . . .	Refers to the joint appendix and pagination.
O. J.A. . . .	Refers to the opinion of the District Court and the findings and conclusions incorporated therein.
E . . .	Refers to the joint volume of exhibits and pagination.
R . . .	Refers to the trial transcript.
'515 patent	Refers to Metco's U.S. patent 3,322,515 in suit. It appears in the joint appendix at E. 805.
'248 patent	Refers to Metco's U.S. patent 3,436,248 in suit. It appears in the joint appendix at E. 816.

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METALLIZING COMPANY OF AMERICA, INC.,

*Plaintiffs-Appellees
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v.

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Appeal from the United States District Court
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DEFENDANT-APPELLANT AND CROSS-APPELLEE'S REPLY BRIEF

I. The Patents Are Valid.

As plaintiffs in their brief seek to intertwine infringement and validity issues, a short comment on their arguments concerning the prior art is believed in order herein.

The crux of the defendant's patented invention resides in the teaching that by selecting aluminum and nickel and combining them into a composite flame spray powder, the

same will inherently be self-bonding when sprayed, constituting the first-known self-bonding powder in the flame spray art. The only prior known self-bonding material was the inferior molybdenum wire, the self-bonding of which did not involve additional heat generation by exothermic reaction, or by any other manner. (D.M.B. 42-44)

The Mackiw Patent

Contrary to plaintiffs' statement in their reply brief, Mackiw does *not* teach the *selection* of nickel and aluminum or "list" it as a "metal pair." Nickel and aluminum are but one of 455 possible permutations which might be found through hindsight combination from the lengthy lists of metals in the patent, the specification of which is devoid of any teaching whatsoever which would direct the artisan toward this selection, or indicate that any advantage could be achieved thereby. (D.M.B. 38-39, 40-41)

Contrary to the implication sought to be left by plaintiffs' brief, the patentee Dittrich did not get the idea for nickel-aluminum composites from Sheritt-Gordon, but had that idea long before Sheritt-Gordon's patent issued and merely had them fabricate such a powder to his order and specification. (D.M.B. 53; O. J.A. 28-30)

That Dittrich himself, because of his earlier work, expected this composite powder to achieve self-bonding results is, of course, *irrelevant* to the issue of patentability. *Shaw v. E.B. & A.C. Whiting Co.*, 417 F.2d 1097, 1105 (2d Cir. 1969). (O. J.A. 67-68)

The Gutzeit Patent

Nothing in the Gutzeit patent teaches or indicates a self-bonding powder. Even if the Gutzeit patent taught a composite powder (which it does not), the selection of nickel and phosphorus would not lead to a self-bonding powder, and there is nothing in the patent's teaching which would even remotely indicate to the artisan a selection that would. (D.M.B. 44-45, 48)

Contrary to plaintiffs' arguments, Gutzeit had nothing to do with the omission of the nickel-phosphorus combination from the application which issued to the patents in suit. The nickel-phosphorus example (which differs from the Gutzeit patent— J.A. 989) along with some twenty others, were simply not carried forward into the patents in suit from the grandfather application, as the same did not constitute part of the particular invention that was being pursued in these patents, but were directed to a different invention also included in the omnibus grandfather application. (J.A. 1022-25; see, *e.g.*, some of the other dropped examples at E. 192-96; see also O. J.A. 96, n.15; D.M.B. 54-55)

Self-Bonding and Aids in Bonding

The art of flame spraying involves heating a metal or ceramic particle and spraying it in molten or semi-molten form onto a surface. (O. J.A. 20). In general, additional heat does not assist a flame spray particle in forming a stronger bond with the surface. Indeed, it often causes

formation of undesirable oxides, creating a weaker bond. (R. 1465-66; J.A. 809-10, 803, 972-73)*

The claims in issue are all directed to nickel-aluminum composite powders, which are unexpectedly self-bonding to smooth, clean surfaces.**

To avoid the implication that the claims covered *only* spraying on such smooth surfaces, to the exclusion of the additional use of conventional surface roughening to enhance reliability, the claims of the '515 patent included the expression "aids in bonding to the surface being sprayed." (J.A. 744-47, 752-53)

As the court noted, in referring to the claims in suit, it is the exothermic heat generated by the novel nickel-aluminum composites of the patentees

"which is claimed to aid the resultant nickel aluminide coating to self-bond, *i.e.* adhere firmly to smooth, clean metal surfaces as well as conventionally roughened surfaces." (O. J.A. 23-24)

Plaintiffs' suggestion that one or more of the prior art powders may achieve self-bonding is totally unsupported by the record and the court found directly to the contrary. (D.M.B. 43-44) Quite obviously, defendant also failed to prove (or even introduce any evidence tending to prove)

* Compare the patentee Dittrich's personal belief that heat affected bonding (R. 1189-90), growing out of his own early work with the nickel-aluminum composites which led to the patents in suit. See generally O. J.A. 26-28. See also the discussion of the *Shaw* case at O. J.A. 67-68.

** Contrary to plaintiffs' argument, self-bonding is a term of art, referring to a bond strength of about 2,000 psi or more on such smooth, clean surfaces. (D.M.B. 5, n.3)

that any prior art material relied upon built on any self-bonding capacity to aid in bonding to conventionally roughened surfaces.

Plaintiffs' argument directed to the absence of the express language "self-bonding" in the claims is totally without merit. It is well established that the inherent characteristics of an invention disclosed in a specification need not be expressly claimed. (D.M.B. 51-52)

Plaintiffs' reliance on *Koppers Co. v. S.S. Corrugated Paper Machine Co.*, 517 F.2d 1182, 1188 (2d Cir. 1975) is plainly misplaced. *Koppers*, like *Great A. & P Tea Co. v. Supermarket Equipment Corp.*, 340 U.S. 147, 149 (1950) upon which it, in turn, relied, stands for the proposition that a patentee may not seek to distinguish the prior art by reference to physical components not recited in his claims.

In the *Koppers* case, the court said that the use of an underfed stack of *glued* boxes to serve as a *machine element* for applying pressure to maintain the integrity of the glued joints of the boxes in the stack could not be relied on as a feature patentably distinguishing from the prior art in that this feature was not inherently included or did not inherently result from the device as claimed, as the claim encompassed a device involving unglued as well as glued box blanks.

The court then held that even if such a result were inherently within the claim, it would still not constitute a patentable improvement over the prior art.

Koppers is, of course, totally distinguishable from the instant case, where the self-bonding is an inherent characteristic resulting from the composition and structure of the powder as claimed and has been held to constitute a patentable improvement over the prior art.

Secondary Criteria

The record shows that the self-bonding powders disclosed in the patents in suit not only met with "conspicuous commercial success" when offered on the market (O. J.A. 69), but were also accepted and recognized as a major breakthrough in the flame spray field. (D.M.B. 55-56)

II. The Patents Are Infringed.

Plaintiffs initially argue that the trial court's finding of non-infringement must be shown to be "clearly erroneous" and attempt to create an aura of complex technical difficulties to dissuade review. This overlooks the fact that of the *seven* issues presented to this Court for review on the question of patent infringement, the "clearly erroneous" rule is applicable to only *one* of these, the other issues involving questions of law. (D.M.B. 2, n.1)

Surprisingly, plaintiffs have chosen to substantially ignore the seven issues presented by defendant in its main brief, offering instead a scattershot response long on straw men and very short on legal and record support.

Literal Infringement

Realizing the clear and unambiguous language of claim 14 and the unequivocal literal infringement thereof by their powder, plaintiffs attempt to distort and misconstrue the decision of the trial court, arguing that the trial court stated that if the claim were read literally, the same would have been invalid.

The court, in its decision, pointed out that the invention did *not* reside in a process of coating one metal powder with an adhesive binder and then adding a coating of another metal particle or in a process of pasting smaller particles of aluminum powder onto larger particles of nickel powder. As the court noted:

“If binding particles of different metals together with an adhesive film was all there was to the patentees’ invention, claim 14 would clearly have been anticipated and would be invalid.” (O. J.A. 80)

Indeed, this method of *making* coated composite particles was found unpatentable by the United States Patent Office in connection with another application of the patentees. (PX 4; O. J.A. 80)

The court found that the key elements of the claims in issue were, in fact, far from the trivial “binding particles of different metals together with an adhesive film,” but instead:

- (1) the selection of the nickel-aluminum composite pair;
- (2) use in a flame spray process;
- (3) exothermic reaction;

- (4) which unexpectedly aids in self-bonding. (D.M.B. 16-18)

These four key elements, used by the court in its comparison of the inventions of the patents in suit with the prior art, clearly withstood the tests of novelty and non-obviousness and were clearly found in the accused infringing powders. (*Ibid*)

Plaintiffs do not deny that claim 14 is literally infringed by their accused powder, and indeed, it is difficult to conceive of claim language which could more exactly describe plaintiffs' accused powder.

Moreover, the literal infringement is not simply a semantic exercise. The claim language was drafted to cover a preferred embodiment of the invention taught in the patent exactly corresponding to the accused powder. The accused powder is made exactly by the procedure taught in the specification for producing this embodiment and contains the preferred components of this embodiment, aluminum and nickel. (J.A. 250-52) It furthermore contains proportions of aluminum and nickel clearly within the teaching of the specification, *i.e.*, 95% by weight of nickel and 5% by weight of aluminum. The specification teaches the use of as little as about 3% aluminum (D.M.B. 25-26) and the patentee's affidavit of June 10, 1968 shows that the "process claimed herein" (E. 791) includes the *exact* accused infringing Exotec powder, made in accordance with Example 31 and having 5% aluminum. (E. 790; D.M.B. 26)

Of course, the accused powder is a flame spray powder, which, when sprayed, generates additional heat by an

exothermic reaction and primarily and most importantly, is self-bonding. (D.M.B. 13, n.8; 17)

The accused powder is thus clearly and unequivocally an embodiment of a powder taught in the specification and specifically covered by claim 14 of the '515 patent.* If, in fact, this embodiment of the patented powder does generate heat by an exothermic oxidation reaction, rather than by reaction between the nickel and the aluminum, all that this would mean was that the inventor had been incorrect in his theory of the reaction mechanism. Such error would in no way adversely affect the validity of the patent** or the artisan's ability to practice the teaching of the patent and reap its benefits. Nor would it prevent those who did, such as the plaintiffs, from being adjudged infringers. (D.M.B. 18-22).

Self-Bonding and the Bond Coat Formed

The broadest aspect of the patented invention, the teaching with respect to intermetallic compound formation, is useful to the artisan in practicing the invention in that it teaches what other metal pairs should be *selected* to achieve self-bonding, *i.e.*, two metals which are capable of exothermically reacting to form an intermetallic compound.

The inventors' first successful self-bonding powder, made of nickel and aluminum, naturally meets this test, but that factor is superfluous, as this pair is specifically taught, exemplified and claimed in the patents in suit as the

* And literally and more broadly covered by claim 4 of the '515 patent and claim 14 of the '248 patent.

** The self-bonding feature of the nickel-aluminum composite is equally unexpected regardless of whether the reaction mechanism is by intermetallic reaction, as theorized, or by oxidation. (D.M.B. 46)

preferred combination. The fabrication of a composite powder from, *e.g.*, nickel and aluminum yields the synergistic and completely unexpected result of self-bonding, which is the essence of the invention.*

The patent teaches these powders are self-bonding (*e.g.*, '515 patent, col. 6, lines 19-21, Example 1, col. 7, lines 23-27; E. 809-10), creating a base upon which additional layers of other materials, not themselves self-bonding, may be flame sprayed. ('515 patent, col. 7, lines 15-17, E. 810)

This is the primary purpose of the patented nickel-aluminum powders, not the formation of a nickel aluminide coating. Any wear resistance qualities of this intermediate coating are obviously of secondary importance because of the overcoat of other material. (J.A. 777-78; R. 2088)

It is for this reason that the Metco 450 (and the identical accused infringing powders) are treated as virtually interchangeable by men skilled in the art with the Metco 404 powder notwithstanding the latter's having 20% aluminum content and concededly forming the harder stoichiometric nickel aluminides such as Ni_3Al in the bond coat. (J.A. 658-59; 776)

Plaintiffs can take scant comfort in the fact that the nickel-aluminum powders they manufacture and sell for their self-bonding properties form coatings which might be less wear resistant than those formed from Metco 404 powders because of a lesser amount of stoichiometric nickel

* The court recognized this by listing the self-bonding feature as the only characteristic of the powders which was a "key element" of the invention. (O. J.A. 59)

aluminum intermetallic compounds. That accused infringers do not make use of *all* the possible benefits of the patents in suit does not assist them in avoiding infringement. *Rex Chainbelt, Inc. v. General Kinematics Corp.*, 363 F.2d 336, 345 (7th Cir. 1966); *Ransburg Electro-Coating Corp. v. Proctor Electric Co.*, 203 F. Supp. 235, 237 (D. Md. 1962), *aff'd*, 317 F.2d 302 (4th Cir. 1963).

The Phase Diagram & Non-Stoichiometric Nickel Aluminide

It is not surprising that plaintiffs cannot take issue with defendant's statement that the trial court, in considering the phase diagram, E. 1004, and concluding that ten percent aluminum was required to form some stoichiometric nickel-aluminide intermetallic compound, committed plain error in failing to note that this was ten atomic percent, which corresponds to *five weight percent* aluminum, the exact amount contained in the accused powder. (D.M.B. 27 & n.17)

If five percent by weight of aluminum is required to form some stoichiometric nickel-aluminide, the teaching in the patent that stoichiometric proportions are not necessary and that an excess of one or the other component is useful ('515 patent, col. 3, lines 51-57) must, therefore, refer to non-stoichiometric nickel-aluminum intermetallic compounds having less than five percent aluminum, a material which plaintiffs and their expert choose to call a solid solution. (D.M.B. 25-28)

Non-Stoichiometric Nickel Aluminide in the Coating

The reaction mechanism of the accused powders is legally irrelevant to this case. (D.M.B. 18-19)* Moreover, as shown in the defendant's main brief, even if it were relevant, there are some nine lines of evidence conclusively showing that the plaintiffs' reaction mechanism is the intermetallic reaction of nickel and aluminum that is theorized in the patents in suit. (D.M.B. 30-36) Of these various proofs, plaintiffs take issue with only one—the proof of nickel-aluminum intermetallic reaction products in the self-bonding coating.

The evidence offered at trial unequivocally shows that coatings formed with the accused powders contain aluminum chemically combined with nickel. (D.M.B. 27-28, 34-36 & n.25) This is clearly what is contemplated by the patent in its teaching of intermetallic compounds having other than stoichiometric proportions and is not changed by the fact that plaintiffs and their expert would choose to call this a solid solution, and on this basis argue that the coatings do not contain any [stoichiometric] intermetallic compound. *Ibid.*

* Dittrich's testimony that he contemplated the exothermic reaction mechanism to be an intermetallic one to be within the scope of the patent was simply a confirmation of his sincerely believed "theory of the invention" and theory of the reaction mechanism of the accused powders. To the extent that plaintiffs seek to use the testimony to interpret the scope of the patents in suit, it is inadmissible as an opinion on a question of law, *Bela Seating Co. v. Poloron Products, Inc.*, 297 F. Sup. 489, 502 (N.D. Ill. 1968), *aff'd*, 438 F.2d 733 (7th Cir. 1971); *Minnesota Mining & Mfg. Co. v. Carborundum Co.*, 155 F.2d 746, 749 (3d Cir. 1946); *Richard T. Green Co. v. Chelsea*, 149 F.2d 927, 930 n.5 (1st Cir. 1945); McCormick on Evidence §13 at 28 (2d ed. 1972), and incompetent as coming from one not a patent attorney.

Plaintiffs' reliance on the testimony of their expert fails to note that he *did* find the non-stoichiometric reaction product of nickel and aluminum once he had an opportunity to inspect the sprayed coatings. (D.M.B. 34-35) Dr. Post concurred and additionally found evidence of the presence of some stoichiometric compound. (*Id.* at 35) The published Longo report, far from supporting plaintiffs, also confirms that the accused powders form nickel aluminide. (*Id.* at 35, n.25)*

The Spurious Issue of Heat of Solution

Metco did not raise the issue of heat of solution; plaintiffs' expert did, and relied on it as his last scientific defense when confronted with evidence that there *was* a reaction product of nickel and aluminum (nickel aluminide) in the coatings formed when flame spraying the accused powders. (D.M.B. 27, 34-35)

Plaintiffs now incorrectly seek to characterize the heat of solution as deriving from a "melting" process, though the record is devoid of supporting proof.** Instead, as plaintiffs' expert conceded, *any* contact between the nickel and aluminum will cause a reaction between them. (J.A. 283-85, 288-89) The combination of 5% aluminum, and even smaller amounts thereof with nickel involves a chemical reaction, with electron exchange (R. 2201-02), which is

* The *ex parte* tests run by plaintiffs' employee Patel, at the eve of trial, without any notice to defendant, were the subject of an extensive critique in defendant's post-trial brief for the District Court (Docket No. 116, Exhibit C at C-9-16; see also R. 1614-32) and his veracity subjected to a separate critique in that brief (*Id.* at Exhibit B). As the District Court failed to credit any of his testimony, the critiques will not be reiterated herein.

** The reference to alleged testimony by the patentee Dittrich is simply in error.

the same reaction involved in the formation of a stoichiometric intermetallic compound, such as Ni_3Al . (R. 2210)

The incremental amount of heat given off for each unit of aluminum which is combined with the nickel is the same. Stated differently, if slightly less than five percent by weight aluminum combines with nickel to form what plaintiffs choose to designate as a solid solution, the heat given off is substantially the same as that given off when slightly more than five percent aluminum combines with nickel to form what plaintiffs choose to designate an intermetallic compound.*

Various witnesses concurred, without contradiction, that the patent teaching of "about 3,000 calories per gram atom" through the use of stoichiometric or non-stoichiometric proportions of components was fully satisfied by a powder containing 5% aluminum (as does the accused powder) or even less. ('515 patent, col. 3, lines 41-57, E. 808; D.M.B. 25-26)

Though plaintiffs would prefer to call the resulting coating a solid solution, men skilled in the art refer to it and all reaction products of nickel and aluminum as the intermetallic compound nickel aluminide. (D.M.B. 27)

Example 31 and Plaintiffs' Powders

In discussing Example 31, plaintiffs totally ignore the Patent Office prosecution and the patentee's own affidavit showing that the "process claimed herein" expressly includes a powder made in accordance with Example 31 and

* DX MM; E. 149, E. 156; J.A. 804-805, 808-09, 721-22, 717-18:

"The curve would not be a straight line like this if there was a difference between a 'solution' heat and a reaction heat in this case." J.A. 807

having 5% aluminum content, precisely the make-up of the accused Exotec powder. (E. 790-91, D.M.B. 26)

Nor do plaintiffs come to grips with the fact that their powders concededly work in substantially the same way to accomplish the same result as those of Example 31, and further generate heat by the same reaction mechanism as the powder exemplified therein. (D.M.B. 14-16) They do note that the patent does not recite an oxidation reaction mechanism, but fail to offer a single legal authority suggesting that the theory of the invention disturbs the patentees' case, even if (contrary to the facts herein) the theory posited in the patent is incorrect. (D.M.B. 18-19)

Finally, while quoting the language of the court reflecting its misunderstanding of plaintiffs' oxidation theory, language adverted to in Defendant's Main Brief at 28, plaintiffs fail to explain how this language can be reconciled with their expert's oxidation theory, which is premised on the physical structure of the composite powder and not the relative amounts of nickel and aluminum. (D.M.B. 28-29)

The Similarity of Exotec and Metco 450

The only legal argument in the defendant patentee's main brief on the "similarity" of the accused Exotec with the patentee's 450 powder was that by exactly copying Example 31 of the patents in suit and then lowering the aluminum content of the powder to make it "equivalent in every respect to the Metco 450 powder" (D.M.B. 9-10) plaintiffs were paying homage to the validity of the patents. (D.M.B. 56)*

* Plaintiffs surprising insistence that the "similarity" was based on "independent development" is exploded by the voluminous, contemporaneous documents to the contrary. (D.M.B. 9-10)

While defendant submits that its 450 powder is plainly within the patents in suit, no argument has ever been advanced that Exotec infringes *because* it is substantially identical to this commercial embodiment and plaintiffs' straw man argument to this effect is plainly irrelevant.

The only prior art patents which expressly teach the oxidation of aluminum powder *fail* to achieve any self-bonding (D.M.B. 45-47) and it is well known and was shown at trial that spraying of aluminum particles known to oxidize fails to achieve self-bonding (D.M.B. 32). Thus, plaintiffs' powders could hardly be following the prior art which teaches oxidation. The self-bonding they achieve is simply that taught by the patents in suit.

Burden of Proof

Plaintiffs admit by their silence that any burden of proof left after the patentee made out its prima facie case was on the accused infringers. (D.M.B. 29-30)

Moreover, they fail completely to offer even a token response to any of the eight numbered lines of evidence presented by defendant that the actual reaction mechanism of their accused infringing powder is an intermetallic reaction rather than an oxidation reaction. (D.M.B. 30-36)

Respectfully submitted,

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Service of 5 copies of the
within Brief is hereby
admitted this 14th day of
March 19 77
Signed M. M. Sadr

Attorney for Plaintiffs, Appellees
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